

author, by effective description and diagrams, shows the asterisms the Great Bear and the Hyades to be but transient phenomena, and the exquisite Corona Borealis but a passing show. New stars, nebulae, and the sun itself next provide material for the author's pen. It will be noticed that the chapters follow, in some sort, an evolutionary sequence. In spite of the temptations of the subject, extravagant and loose statements are rare, though a few have been met in reading. To state that "except for the interference of the moon, we should probably never have known that there is any more of the sun than our eyes ordinarily see" is forgetting that the spectroscope was at least a possibility whether eclipses had occurred or not. Similarly forgetful is the remark that "no instrument now in the possession of astronomers could assure us" that there are planets revolving round other stars than the sun. The statement respecting Mercury that its "average temperature is more than six and a half times that prevailing on the earth" is quite inexcusable. Some attempt at precision in a matter quite capable of being stated clearly is surely worth while.

In spite of such blemishes the book, as a popular exposition of certain phases of modern astronomy, ranks high. Hypotheses respecting the zodiacal light mystery are clearly set forth, while auroræ, comets, and meteorites are suggestively treated. Chapters dealing with the moon, Mars, and the riddle of the asteroids bring an interesting work to a conclusion. Some thirty full-page half-tone reproductions of photographs are inserted, most of them being well chosen and excellently reproduced.

The printing and binding are satisfactory, but the inset illustrations are not securely fastened and are liable to come out. T. F. C.

WONDER BOOKS OF SCIENCE.

- (1) *The Wonder Book of Magnetism*. By Dr. E. J. Houston. Pp. x+325.
- (2) *The Wonder Book of Light*. By Dr. E. J. Houston. Pp. xii+349. (London: W. and R. Chambers, Ltd., 1909.) Price 3s. 6d. each.

DR. HOUSTON has attempted, in these two volumes, to deal with the two specified sections of physics in such a way as to render them interesting to young people. In order to attain this end he has had recourse to the somewhat novel method of frequently using fairy stories as illustrations. Dr. Houston has had considerable experience in teaching the young, and, therefore, probably knows far better than the writer the kind of treatment of the subjects most likely to appeal to them. But the general impression obtained by an adult reader is that the illustrations are, to say the least, far-fetched, and that it is surprising if children, while sufficiently young to take delight in the fairy stories, can also appreciate the serious parts of the books. We hardly expect to find in the same volume the story of "The Blowing Servant of Fortunio" and the description of Zeeman effect as "the duplication or triplication of spectrum lines when the glowing vapour is subjected to a

powerful magnetic field." Nor is it usual to associate "The Magic Wand of Prince Percinet" with a treatment of the colours of thin films and the colour of skylight.

The parts of the books which actually deal with physics are excellent. The language is generally simple, and the discussion is much more clear and exact than is usually the case in elementary treatises. Stripped of the fairy stories, both volumes could be read with much profit by grown persons desirous of enlightenment on magnetism and light. The probability is, however, that such seekers would be warned off by the juvenile complexion of the work, and thus miss the abundance of useful information contained therein. One further criticism is that some of the diagrams, of which each volume contains a considerable number, are badly reproduced. This, however, is not surprising when the low price of the books is taken into account.

With regard to the contents of the separate volumes, that on magnetism contains, besides the usual description of the properties of magnets, an interesting chapter on the history of the discovery of magnetism, and another on the possible causes of terrestrial magnetism. The auroral light and its bearing on the latter is also fully described. The reciprocal relations between magnetism and electricity are clearly stated, and a chapter is devoted to the electromagnetic theory of light. As examples of the less serious side of the volume may be mentioned the chapters entitled "Have Magnets Healing Powers?" and "Magnetism and Magic."

Among the special subjects treated in the volume on light, attention may be directed to the chapter entitled "The Light Mill," in which Crookes's radiometer is described, and to those on optical illusions and the effects of persistence of vision. Others are phosphorescence and fluorescence, X-rays and radioactivity, photography, soap-bubble colours, opalescence and polarised light. These are all dealt with quite briefly, but, nevertheless, in a lucid and interesting manner.

In conclusion, one may congratulate the juvenile readers upon having these two books so carefully written on their behalf, and express the hope that some time the author may see his way to publish the volumes in a slightly revised form suitable for older children.

OUR BOOK SHELF.

The Periodic Law. By A. E. Garrett. International Scientific Series. Pp. vi+294. (London: Kegan Paul and Co., 1909.) Price 5s.

THIS book may be viewed in two aspects—as a body of information and as a narrative. As a body of information it is very comprehensive. In no other work dealing with the periodic law, so far as the present writer knows, has the statistical information been set forth so fully and discussed in such detail. The author deserves all the credit due to a laborious compiler, and it may seem ungrateful to make any qualification in acknowledging such services. Little seems to have been omitted in the way of

facts. The more recent work on tellurium is not adequately dealt with, nor is there a reference to the calculations of Strutt in reference to Prout's hypothesis, but there is little occasion for complaint on this head and much to acknowledge. There is a good deal of historical detail as well, and on all these grounds Mr. Garrett's book will no doubt find its way to chemical libraries and be valued as a book of reference.

When, however, we come to view the book as a narrative, it suffers from its wealth of detail, and does not seem to be in line with the well-known series to which it belongs. This is perhaps a matter which concerns the editor more than the reviewer; but the periodic law can furnish a capital narrative of a type which made the International Scientific Series famous a generation ago, a type which is preserved in the recent welcome additions. From this point of view Mr. Garrett's book is not only impaired by its abundance of statistics, but by carelessness of style. The English is very far from smooth, and such sentences as "Many things, no doubt, in some measure helped to bring about the state of affairs which proved to be the natural forerunners of such a climax" are very uncomfortable to an arm-chair reader. A. S.

Leitfaden der Pflanzenkunde für höhere Lehranstalten. By Dr. K. Smalian. Pp. 326. In five parts. (Leipzig: G. Freytag; Vienna: F. Tempsky, 1909.) Price, part i., 1 mark; part ii., 1.25 marks; part iii., 1.30 marks; part iv., 2.25 marks; part v., 2 marks.

IN these days, when many authors attempt to compress as much information as possible into their textbooks, it is unusual to find an introduction to morphological and systematic botany spread over five annual courses. It should, however, be noted that each course is a short one, sufficient for one term's work, or possibly for two.

The first volume contains a series of descriptions of individual plants, arranged, according to their flowering periods, from March to July, and, so far as possible, in a sequence of complexity. A further series is given in the second course, as well as a few comparative summaries of related plants by which family limitations are introduced. The third and fourth parts are similar, except that the family synopses are more numerous, and eventually plant-associations are explained. In the fifth volume the author describes types of the Coniferæ, pteridophytes, and lower cryptogams, including the bacteria and myxomycetes; he also presents an account of the more common plants of economic value, and a brief epitome of plant geography. In addition, summaries are provided at the end of each volume, partly to recapitulate main facts, and partly for drawing comparisons. In this way the Linnean system is expounded in the third and fourth volumes. Numerous artistic coloured plates add considerably to the value of the book, especially where they depict the plants in natural habitats and associations.

The production of the book, the subject-matter, and the arrangement all merit strong commendation. The fundamental training in morphology by means of practical observation leads naturally to classification and ecology of plants. But two general objections suggest themselves; first, that there is need for more physiology, and, secondly, that in five annual courses a schoolboy could be taught considerably more botany than is contained in these volumes; as regards the latter, there is no reason why after the first summer session the remaining parts should not

be taken more expeditiously. It may also be suggested that a good account of plant distribution instead of so many cryptogamic types would have been much more suitable for the last volume.

Die Bienen Afrikas nach dem Stande unserer heutigen Kenntnisse. By Dr. H. Friese. Edited by Dr. Leonhard Schulze. Pp. 85-475, and plates. (Jena: Gustav Fischer, 1909.) Price 36 marks.

THIS important work is primarily based on the collections made by Dr. Schulze, who obtained forty-two species in Western South Africa as against forty-seven recorded by Bingham for the Transvaal and Natal. But Dr. Friese has taken the opportunity to include the Ethiopian region south of Senegal and Abyssinia. Abyssinia is only included in respect of Xylcopa, and Madagascar is excluded, as it has a separate fauna already discussed by Saussure in Grandidier's work.

A prominent feature of Prof. Friese's work is the series of maps of Africa showing the distribution of various species of bees throughout Africa; while other maps show the distribution of various important genera of African bees throughout the world. This is followed by a short bibliography, and even on the same page the technical portion of the work is commenced by a list of the thirteen African species of Prosopis. This is followed by a table of five South African species after Alfken and descriptions of the whole thirteen species, in the original language (Latin, German, or English) in which they were published. The remaining genera and species are similarly treated, a list of all the species being first given, and sometimes (but not always) a more or less complete table of the species, before they are described. On p. 124 an elaborate figure is given of the mouth-organs of *Polyglossa capensis*, n.sp. The book concludes with a list of thirty-five genera and 783 species of African bees (including the subspecies of *Apis mellifica*), many of which are described as new in the present volume, and an alphabetical index. The two coloured plates of bees, &c., are excellent. W. F. K.

Logic of Nature: a Synthesis of Thought. By Arthur Silva White. Pp. 58. (Privately printed by T. and A. Constable.)

THIS is an attempt to "outline a system of thought by which unity of world-conception may be predicated." It is a large order—vulgarily speaking—and a pamphlet of fifty-eight pages cannot be expected to give very clear notions of the author's views. Neither can a short review give a very clear notion of the pamphlet, which, for the rest, is very tough reading even for those who have spent much time and thought on the subject. The following "heads," however, will suggest the general drift.

There are four spheres or planes in the macrocosm: lithosphere, hydrosphere, atmosphere, and ethersphere, which last-named is "the psychosphere of mind"—"the energy of thought." Matter is the vehicle of energy. Intelligence is at the root of things; immanent Deity must be postulated. "*Nature is the thinking-process of the God-head*"—a striking and suggestive phrase.

The author quotes appositely from Sir J. J. Thomson, Sir J. Larmor, Snyder, and others on the physical side; and from Spinoza, Mill, Spencer, and Hamilton on the side of logic or metaphysics. His conclusion is of course idealistic. "The ultimate reality of the sum of things cannot—so far as man is concerned—have existential import except in terms of thought; and therefore thought itself is the ultimate reality" (p. 36).